Distance Learning: Facts, Failures, Foibles, and the Future

Robert Easton and John Stratton
College of Applied Science and Technology
Rochester Institute of Technology

Abstract:
Within the last decade there has been a strong push for colleges and universities to provide distance-learning opportunities. While “correspondence” schools have been in existence for many years, the “brick and mortar” schools have traditionally felt the classroom setting was the preferred and appropriate venue for higher-level education. The rapid growth of access to the Internet and depth and breadth of information found therein has caused a rethinking of teaching methodologies within the educational community.

Rochester Institute of Technology has transitioned in the past two decades from a “seat in the classroom” format to an “internet friendly” format. The engineering technology programs at RIT have been pioneers in this movement to reach a broader audience. While engineering technology programs were attractive to regional participants, geographical distances limited the availability of these options. An early attempt to broaden the geographical reach of courses and programs included satellite locations with RIT faculty traveling extensively to provide instruction. Transitioning through an era of videotaped lectures, RIT and the engineering technology programs now have a firm commitment to internet-based distance learning.

The paper investigates the advancements made by the engineering technology programs at RIT, analyzing the successes and shortfalls, and looking at future potential and possibilities in providing quality educational programs to students at remote locations. The author has taught several cycles of Strength of Materials via web-based distance learning.

The purpose of this paper is to describe the transition that has occurred over the past two decades at Rochester Institute of Technology (RIT) related to delivery of academic instruction. RIT, a traditional “bricks and mortar” university, has a long and impressive history of providing a sound technical education to prepare graduates for a successful career in business and industry. Customarily, instruction was conducted on the central campus in classroom and laboratory settings. This mode of instruction was suitable for many years and met the needs of the Rochester, NY community.

Beyond the Horizon

While RIT has long had a part-time evening program to accommodate adult learners, this program was operated in a fashion similar to the full-time day program. In the 1970’s it became apparent that there was a potential to expand instructional offerings to other geographical areas, especially the programs offered in the School of Engineering Technology. RIT was unique
within western New York State in that it housed the only bachelor’s programs in Engineering Technology.

The School of Engineering Technology, housed in the College of Applied Science and Technology, was quick to realize this market potential. The initial approach for developing this potential incorporated remote site teaching. In practice, it involved faculty members traveling to remote sites to conduct classes on a scheduled basis. Often it was possible to link with a community college in the off-campus area. The host school would provide the classroom space while providing opportunities to their students to take RIT courses. Both institutes gained in the process.

While this technique provided greater market exposure to RIT, it had serious drawbacks. Repeated travel to distant locations imposed a strain on travel budgets. Faculty members were reluctant to engage in distance courses while teaching a traditional classroom schedule at RIT. Travel to remote sites during the winter months was chancy at best and often hazardous, resulting in frequent cancellations of sessions. Surely there must be a better way.

Transition to Efficiency

The first attempt to reduce the travel burden entailed hiring adjunct faculty in the remote areas to teach the specific courses offered. At some locales this worked well, but it was not always possible to find a highly qualified person willing and able to teach a course, usually in the evening. An additional drawback to this system was discovered when trying to match the quality of teaching of the remote classes to those same classes offered at RIT. This proved worrisome, because in many cases these remote courses were being applied toward the TAC of ABET bachelor’s degrees offered by RIT.

To overcome the concern for disparity in quality, RIT transitioned to a videotape based program. Actual lectures conducted on the RIT campus were videotaped, annotated with closed captioning, and packaged with supplemental handouts to be delivered to students at remote locales. This system incorporated scheduled conference calls for members in the group taking a specific course. These calls could also be supplemented by phone conversations between the faculty member and individual students.

The videotaped methodology seemed to provide a satisfactory solution to several problems. Travel by faculty was virtually eliminated. It was no longer necessary to locate qualified adjuncts to deliver remote courses. Conference calls gave students contact with RIT faculty on a routine basis, and provided communication between other students taking the course in other geographical areas.

Students appreciated this technique to a greater degree than anticipated. The ability to watch a lecture at a time convenient to the student, and to watch it several times if needed, was viewed by students as a positive change. In that tape players were in common use by this time, there was no financial burden placed on the student to obtain technical equipment. As RIT provided the tapes to the students on a refundable-deposit basis, their only cost other than tuition was for the text and related materials.
RIT soon realized that the cost of producing, editing, annotating, and reproducing multiple copies of tapes of each lecture being offered in the distance mode was significant. The more successful the program became, the more pressure there was to add additional courses, and the more it cost to run the program. The cost per student taking a course via the distance mode was significantly greater than the cost for a student sitting in a classroom taking the same course. More students, but at greater cost, doesn’t necessarily improve the balance sheet. Luckily the solution was just around the corner, for the nation was moving rapidly toward a “wired” economy based on the spectacular advances in the field of microelectronics. The computer age was dawning. There will be more about that later.

Where’s The Lab?

Engineering Technology prides itself on the emphasis placed on laboratory experiences. Through the years of growth of RIT’s distance program, the need to meet the laboratory requirements of the various courses provided a challenge. Often the remote host colleges were poorly equipped to provide adequate laboratory support for engineering technology courses. As the program transitioned from groups in classrooms to individuals in front of their television sets, the laboratory question became even more problematic.

The solution that seemed to provide the best opportunity to students required them to travel to the RIT campus for two weekends during the 12-week cycle of the quarter system. The weekends were devoted to doing a series of laboratory experiments and exercises, with reports to be developed subsequently and mailed to the RIT faculty member. While this was somewhat burdensome on the students, it ensured that the crucial laboratory experience was obtained. This is still the practice, now that internet-based instruction has supplanted previous modes.

The Wired Generation

With the advent of the computer age, and the proliferation of computers in the home, the mode of communicating to remote areas took a dramatic shift. As one of the recognized “wired campuses” in the country, it was second nature for the faculty to incorporate web-based communication in the distance learning program. The transition was not without difficulty, however. Early host sites for web-based instruction had a variety of flaws, which made them frustrating for faculty and students alike. Since the mid-1990’s RIT has used four different modules to provide information and services to students enrolled in distance learning. A fifth module is currently being tested for potential adoption. With each change in module, the faculty members have to experience a new “learning curve”. The students usually take only a few courses “on-line” and seldom experience more than one of the changes.

Because computers are commonplace in homes, distance students seldom face large initial investments when enrolling. RIT provides the necessary software through a licensing agreement with the software provider. Assuming the student’s computer has adequate memory available and the operating system is current, the investment is typically limited to tuition and the purchase of a text and related support materials. This has greatly reduced the cost per student for RIT, compared to the videotape mode.
Where is Everybody?

One of the perceived shortfalls of online distance learning is the lack of personal contact between teacher and student and among students. This lack of personal connection is obviously a hindrance in the teaching-learning process. Communication by e-mail, telephone, and FAX has to replace the “eye-ball” contact that has served well in the traditional classroom setting. It is essential to establish within the group of students in a course a sense of community, for both the instructor and the students. A useful technique is through a discussion panel where students and the instructor post short biographical sketches as a means of becoming acquainted. This discussion area can then serve as a means for students to exchange comments and viewpoints on techniques of solving assigned work.

Another drawback to distance learning is the difficulty in establishing an environment conducive to learning. Much of this relies on the initiative and self-motivation of the student. Distance learning implies a degree of initiative on the part of the student, driven by a perceived need for the knowledge sought.

When first developing a course to be delivered through a distance learning mode, there is a temptation to use the materials used in classroom delivery. Due to the sterile nature of information delivery through the internet, classroom materials usually are insufficient without supplement. The intonation, body language, and dynamics of the lecture are missing, and cannot easily be imagined by most students. Elaboration on difficult issues, use of examples, and supplemental notes usually will assist the students in adequately absorbing the material.

Web-based instruction need not be totally static. Most recent vintage computers can accommodate streaming video, which can be provided on the internet sites via suitable links to servers where the videos can be retrieved. Videos of high quality related to engineering technology course work are becoming available from commercial sources, through purchase or licensing arrangements.

Is It Working?

How may one determine if the desired educational outcomes are being achieved? Graded homework assignments and proctored examinations provide the basic feedback for determining levels of proficiency attained by the students. In that many of the students are adult learners employed in firms that perform functions related to the subject material in the courses, there is usually ample local guidance available to supplement faculty assistance. Students can actually sense that they are mastering the material while demonstrating their interest to improve their skills in their work environment.

A measure of success of a program can be obtained by conducting properly designed surveys of the target group. RIT routinely invites students to respond to course evaluation questionnaires regarding course content, format, execution, and student satisfaction. Students are also asked to provide comments and recommendations for improvement in a “free response” section. Response rate is typically in the eighty to ninety percent range, and provides valuable feedback.
for the improvement of course delivery. By and large, students report a high degree of satisfaction with the courses and their experiences in the program.

RIT’s success in distance learning has prompted the State University of New York (SUNY) to move into this learning mode in the last decade. With the establishment of the SUNY Learning Network (SLN), online instruction is offered to the sixty-four colleges and nearly 400,000 students enrolled in the university system. Their offerings have grown from 8 courses in 1995-1996 to over 3200 in 2002-2003 with growth in enrollment from 119 to over 50,000.\(^1\) Their offerings cover the entire spectrum of undergraduate courses, with most being in the Liberal Arts category.

Such a large number of students provide a statistically significant population to be surveyed. SLN has conducted voluntary web-based surveys to evaluate pedagogy, faculty development, student satisfaction, and reported learning related to online instruction. Results of their surveys reflect a high degree of satisfaction (85% range) by students with the content, management, and outcomes of the online experience.\(^1,2\)

Allen and Seaman in *Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003,\(^3\)* report the results of a survey of Chief Academic Officers of degree granting institutions of higher education in the United States. The report provides some interesting statistics related to online learning.

- Over 1.6 million students took at least one online course during Fall 2002
- Over one-third of these students took all of their courses online.
- Among all U.S. higher education students in Fall 2002, 11 percent took at least one online course.
- Among those students at institutions where online courses were offered, 13 percent took at least one online course.

The report compared face-to-face and online learning outcomes. Respondents reported equal or better outcomes for online courses at the 58.2 percent level. The respondents further estimated that those results would improve within three years to approximately 75 percent.

The survey also asked respondents to estimate growth in popularity. The tabulated results indicate a projected annual growth rate of nearly 20 percent.

The Future

Technology improvements have permitted the rapid growth in distance learning. Not only has the geographical reach of a university been expanded, but the concept of coursework without a classroom setting has been fully accepted. Already, the transition to “blended courses”, that is courses that combine classroom activity with online learning, is underway. The convenience of anytime, anywhere a laptop can access the internet is too attractive a concept to disappear. The future will bring more innovation, faster access, and greater utilization. Distance learning is here to stay.
Bibliography

Biographical Information

ROBERT EASTON is Professor of Civil Engineering Technology at Rochester Institute of Technology. Robert joined the faculty in 1978 after completing 22 years of active duty with the US Army Corps of Engineers. During his 25-year tenure at RIT he has served as Chair of the Civil Engineering Technology Department and has taught a wide range of courses in that department. He has taught Applied Mechanics of Materials online for three years.

Professor JOHN STRATTON has chaired two different ET departments at RIT and served as Associate Dean of the College of Applied Science and Technology for the past 24 years. He is currently on sabbatical and will return to his first love of teaching full time. He has a BSEE degree from RIT and an MSEE from Rensselaer Polytechnic Institute. He worked three years in industry before entering teaching in 1969 and continues to consult on a part-time basis.